

CLAIMS

What is claimed is:

- 1 1 A system for generating a graphical user interface for an application program,
2 comprising:
3 one or more business objects that define functions of the application program;
4 one or more metadata elements defining parameters for the functions of the business
5 object;
6 a controller configured for invocation by a browser and communicatively coupled to
7 one or more actions, widgets, and panels;
8 wherein the controller comprises logic for receiving a user request from the browser
9 and dispatching the user request to one or the actions;
10 wherein the actions interact with the business objects through service object module
11 interfaces that provide service object parameter values to the actions;
12 wherein the controller associates the service object parameter values with one of the
13 widgets, places the one of the widgets in one of the panels, and generates an
14 HTML user interface page that includes the panel.

- 1 2. A method of automatically generating a consistent user interface for an application
2 program, the method comprising the computer-implemented steps of:
3 receiving one or more business objects that each define a user action for the
4 application program;
5 receiving one or more metadata elements defining parameters for the user actions of
6 the business object;
7 invoking a controller that is communicatively coupled to one or more actions,
8 widgets, and panels;
9 receiving a user request from the browser and dispatching the user request to one or
10 the actions;
11 obtaining, using the actions, one or more parameter values from the business objects;

12 associating the business object parameter values with a widget selected from among
13 the one or more widgets;
14 associating the selected widget with a panel selected from the one or more panels; and
15 generating an HTML user interface page that includes the selected panel.

1 3. A method as recited in Claim 2, wherein the business object parameters are associated
2 with one of the widgets based on the user request.

1 4. A method as recited in Claim 2, wherein the application program is a network
2 management application program.

1 5. A method as recited in Claim 2, wherein receiving one or more business objects that
2 define functions of the application program comprises receiving an XML file that defines the
3 business objects and one or more of the parameters for the business objects.

1 6. A method as recited in Claim 2, further comprising the step of generating, using the
2 widget, client-side executable program code that performs one or more data validation or
3 access control operations on user input for the user operation.

1 7. A method as recited in Claim 2, wherein the step of receiving a user request
2 comprises receiving a user request from the browser and dispatching the user request to one
3 or the actions, wherein the actions interact with the business objects through service object
4 module interfaces that provide parameter values for the business objects to the actions.

1 8. A method as recited in Claim 2, further comprising the steps of:
2 receiving user input in a field of the user interface that is associated with the widget,
3 wherein the user input is received in HTML elements of an HTTP request
4 from a browser;
5 converting the user input from the HTML elements into one or more programmatic
6 objects having an appropriate data type for use by the application program.

- 1 9. A method as recited in Claim 2, further comprising the step of associating a first
2 widget with a second widget, wherein the first widget and second widget are related by a
3 containment hierarchy.
- 1 10. A method as recited in Claim 2, wherein each of the widgets represents one or more
2 properties of the business objects by an HTML element.
- 1 11. A method as recited in Claim 2, wherein the step of generating an HTML user
2 interface page that includes the panel further comprises generating an HTML user interface
3 page that includes one or more of JSP files, static HTML elements, style sheets, or images.
- 1 12. A method of automatically generating a consistent user interface for a network
2 management application program, the method comprising the computer-implemented steps
3 of:
4 receiving one or more definitions of service objects, wherein each definition specifies
5 a user action for the network management application program;
6 receiving one or more metadata elements defining parameters for the user actions of
7 the service objects;
8 invoking a controller that is communicatively coupled to one or more actions,
9 widgets, and panels;
10 receiving a user request from the browser and dispatching the user request to one or
11 the actions;
12 obtaining one or more parameter values from the service objects by interaction of the
13 actions with service object model interfaces that are implemented by the
14 service objects;
15 associating the service object parameter values with a widget selected from among
16 the one or more widgets;
17 associating the selected widget with a panel selected from the one or more panels; and
18 generating an HTML user interface page that includes the selected panel.

- 1 13. A computer-readable medium carrying one or more sequences of instructions for
2 generating a consistent user interface for an application program, which instructions, when
3 executed by one or more processors, cause the one or more processors to carry out the steps
4 of:
- 5 receiving one or more business objects that each define a user action for the
 - 6 application program;
 - 7 receiving one or more metadata elements defining parameters for the user actions of
 - 8 the business object;
 - 9 invoking a controller that is communicatively coupled to one or more actions,
 - 10 widgets, and panels;
 - 11 receiving a user request from the browser and dispatching the user request to one or
 - 12 the actions;
 - 13 obtaining, using the actions, one or more parameter values from the business objects;
 - 14 associating the business object parameter values with a widget selected from among
 - 15 the one or more widgets;
 - 16 associating the selected widget with a panel selected from the one or more panels; and
 - 17 generating an HTML user interface page that includes the selected panel.
- 1 14. A computer-readable medium as recited in Claim 13, wherein the business object
2 parameters are associated with one of the widgets based on the user request.
- 1 15. A computer-readable medium as recited in Claim 13, wherein the application
2 program is a network management application program.
- 1 16. A computer-readable medium as recited in Claim 13, wherein receiving one or more
2 business objects that define functions of the application program comprises receiving an
3 XML file that defines the business objects and one or more of the parameters for the business
4 objects.

1 17. A computer-readable medium as recited in Claim 13, further comprising instructions
2 for performing the step of generating, using the widget, client-side executable program code
3 that performs one or more data validation or access control operations on user input for the
4 user operation.

1 18. A computer-readable medium as recited in Claim 13, wherein the step of receiving a
2 user request comprises receiving a user request from the browser and dispatching the user
3 request to one or the actions, wherein the actions interact with the business objects through
4 service object module interfaces that provide parameter values for the business objects to the
5 actions.

1 19. A computer-readable medium as recited in Claim 13, further comprising instructions
2 for performing the steps of:
3 receiving user input in a field of the user interface that is associated with the widget,
4 wherein the user input is received in HTML elements of an HTTP request
5 from a browser;
6 converting the user input from the HTML elements into one or more programmatic
7 objects having an appropriate data type for use by the application program.

1 20. A computer-readable medium as recited in Claim 13, further comprising instructions
2 for performing the step of associating a first widget with a second widget, wherein the first
3 widget and second widget are related by a containment hierarchy.

1 21. A computer-readable medium as recited in Claim 13, wherein each of the widgets
2 represents one or more properties of the business objects by an HTML element.

1 22. A computer-readable medium as recited in Claim 13, wherein the step of generating
2 an HTML user interface page that includes the panel further comprises generating an HTML
3 user interface page that includes one or more of JSP files, static HTML elements, style
4 sheets, or images.

1 23. An apparatus for generating a consistent user interface for an application program,
2 comprising:
3 means for receiving one or more business objects that each define a user action for
4 the application program;
5 means for receiving one or more metadata elements defining parameters for the user
6 actions of the business object;
7 means for invoking a controller that is communicatively coupled to one or more
8 actions, widgets, and panels;
9 means for receiving a user request from the browser and dispatching the user request
10 to one or the actions;
11 means for obtaining, using the actions, one or more parameter values from the
12 business objects;
13 means for associating the business object parameter values with a widget selected
14 from among the one or more widgets;
15 means for associating the selected widget with a panel selected from the one or more
16 panels; and
17 means for generating an HTML user interface page that includes the selected panel.

1 24. An apparatus as recited in Claim 23, wherein the business object parameters are
2 associated with one of the widgets based on the user request.

1 25. An apparatus as recited in Claim 23, wherein the application program is a network
2 management application program.

1 26. An apparatus as recited in Claim 23, wherein the means for receiving one or more
2 business objects that define functions of the application program comprises means for
3 receiving an XML file that defines the business objects and one or more of the parameters for
4 the business objects.

1 27. An apparatus as recited in Claim 23, further comprising means for generating, using
2 the widget, client-side executable program code that performs one or more data validation or
3 access control operations on user input for the user operation.

1 28. An apparatus as recited in Claim 23, wherein the means for receiving a user request
2 comprises means for receiving a user request from the browser and dispatching the user
3 request to one or the actions, wherein the actions interact with the business objects through
4 service object module interfaces that provide parameter values for the business objects to the
5 actions.

1 29. An apparatus as recited in Claim 23, further comprising:
2 means for receiving user input in a field of the user interface that is associated with
3 the widget, wherein the user input is received in HTML elements of an HTTP
4 request from a browser;
5 means for converting the user input from the HTML elements into one or more
6 programmatic objects having an appropriate data type for use by the
7 application program.

1 30. An apparatus as recited in Claim 23, further comprising means for associating a first
2 widget with a second widget, wherein the first widget and second widget are related by a
3 containment hierarchy.

1 31. An apparatus as recited in Claim 23, wherein each of the widgets represents one or
2 more properties of the business objects by an HTML element.

1 32. An apparatus as recited in Claim 23, wherein the means for generating an HTML user
2 interface page that includes the panel further comprises means for generating an HTML user
3 interface page that includes one or more of JSP files, static HTML elements, style sheets, or
4 images.

1 33. An apparatus for generating a consistent user interface for an application program,
2 comprising:
3 a network interface that is coupled to the data network for receiving one or more packet
4 flows therefrom;
5 a processor;
6 one or more stored sequences of instructions which, when executed by the processor, cause
7 the processor to carry out the steps of:
8 receiving one or more business objects that each define a user action for the
9 application program;
10 receiving one or more metadata elements defining parameters for the user actions of
11 the business object;
12 invoking a controller that is communicatively coupled to one or more actions,
13 widgets, and panels;
14 receiving a user request from the browser and dispatching the user request to one or
15 the actions;
16 obtaining, using the actions, one or more parameter values from the business objects;
17 associating the business object parameter values with a widget selected from among
18 the one or more widgets;
19 associating the selected widget with a panel selected from the one or more panels; and
20 generating an HTML user interface page that includes the selected panel.

1 34. An apparatus as recited in Claim 33, wherein the business object parameters are
2 associated with one of the widgets based on the user request.

1 35. An apparatus as recited in Claim 33, wherein the application program is a network
2 management application program.

1 36. An apparatus as recited in Claim 33, wherein receiving one or more business objects
2 that define functions of the application program comprises receiving an XML file that
3 defines the business objects and one or more of the parameters for the business objects.

1 37. An apparatus as recited in Claim 33, further comprising instructions for performing
2 the step of generating, using the widget, client-side executable program code that performs
3 one or more data validation or access control operations on user input for the user operation.

1 38. An apparatus as recited in Claim 33, wherein the instructions for performing the step
2 of receiving a user request comprise instructions for performing the step of receiving a user
3 request from the browser and dispatching the user request to one or the actions, wherein the
4 actions interact with the business objects through service object module interfaces that
5 provide parameter values for the business objects to the actions.

1 39. An apparatus as recited in Claim 33, further comprising instructions for performing
2 the steps of:

3 receiving user input in a field of the user interface that is associated with the widget,
4 wherein the user input is received in HTML elements of an HTTP request
5 from a browser;
6 converting the user input from the HTML elements into one or more programmatic
7 objects having an appropriate data type for use by the application program.

1 40. An apparatus as recited in Claim 33, further comprising instructions for performing
2 the step of associating a first widget with a second widget, wherein the first widget and
3 second widget are related by a containment hierarchy.

1 41. An apparatus as recited in Claim 33, wherein each of the widgets represents one or
2 more properties of the business objects by an HTML element.

1 42. An apparatus as recited in Claim 33, wherein the instructions for performing the step
2 of generating an HTML user interface page that includes the panel further comprises
3 generating an HTML user interface page that includes one or more of JSP files, static HTML
4 elements, style sheets, or images.